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Psychobiological Referents for the Treatment of Autism.

Indiana Univ., Indianapolis. Medical Center.

Spons Agency-Office of Education (DHEW), Washington, D.C.

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Note-25p.; Paper presented at Indiana University Colloquium on Infantile Autism, Indiana University Medical Center, Indianapolis, Indiana, April, 1968

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Psychobiological Referents for the Treatment of Autism*

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Early infantile autism was introduced by Kanner (1943) 25 years ago with clear behavioral signs of the disorder. Other diagnostic labels appeared such as symbiotic psychosis (Mahler, 1953), atypical child (Rank, 1950), childhood schizophrenia (Bender, 1956), all referring to related, severe disturbances in children. More recently, however, the overlap between these various diagnostic terms has been pointed out by Creak (1964), Rutter (1965) and Wing (1966).

Until the past five years autism was conceptualized primarily as a psychodynamic disorder (Bettelheim, 1950; Szurek, 1960; Rank, 1950). Psychoanalytic theory had provided a metaphorical biology which remained independent of growing empirical research. This powerful theory was used to show the impact of irrational environmental forces upon drives and emotions in the development of personality deviations. Infantile autism was generally considered to be the child's response to cold or pathological attitudes and management by his parents, especially the mother.

Recent developmental research has offered a timely reminder that infants are born with individual traits, some of which survive a variety of experiences over time. Some infants are known to be "cuddly" babies while others are not and would rather be handled less regardless of maternal attitudes (Schaffer, 1964). The longitudinal studies of Thomas, et. al. (1964) demonstrated continuity of other infant traits over the first two years of life. The intensity of the infant's

reactions to sensory stimuli, to internal states, to human and non-human interactions showed a significant stability. Other traits such as threshold of responsiveness to sensory and social stimuli and adaptability to environmental changes remained stable over time. This study suggested that the stability of these traits involved constitutional and genetic factors. The implications of this research for the understanding of autism is not, however, in its contribution to the nature-nurture controversy. An interaction between constitutional factors and environmental events is generally conceded even by environmentalists. More important is the suggestion for how the clinical and behavioral data on an individual autistic child can be evaluated for purposes of therapeutic intervention. If an aloof and unresponsive autistic child is raised by a cold, intellectual mother, the emphasis of the clinical investigation under the psychodynamic orientation will be on how the mother got to be that way, how she maintained her influence on the child, and how to modify and correct her effect on the child. Within a psychobiological orientation the emphasis of the clinical investigation will be on how such autistic traits as unresponsiveness show across the child's stimulus universe. The child may show a similar indifference to all kinds of objects and toys which have few stimulus properties in common with the mother, while being intensely responsive to a few select objects. Intervention can then be planned with stimulus patterns to which the child is responsive.

In this report four main questions are discussed. (1) What is the nature of the autistic disorder? (2) What are the impaired perceptual mechanisms underlying the disorder? (3) What are the chief characteristics of the parents of autistic children? (4) What are the implications of these three questions for the training and management of young autistic children?

Autistic symptoms

At least two trends may be inferred from the multiple efforts to classify

the severe disturbances of childhood. Some of the diagnostic terms owe their significance to their base in psychoanalytic theory (Mahler, 1952; Szurek, 1960; Bettelheim, 1950). As the identification of such children has increased, classification has been based more on behavioral description (Creak, 1964; Wing, 1966; and Rutter, 1965). The most recent proclivity for classification has reached the point where Ornitz and Ritvo (1968) have inventoried about 134 related autistic behaviors. Resolutions to the classification controversy are handicapped by problems of sampling from a heterogeneous population.

In our own work with preschool autistic children under four years of age the criteria of the Creak (1964) working party have been most useful for identifying and selecting the children for our project. For our limited age group four related subclusters of symptoms have been derived from the Creak criteria:

- (1) Failure in establishing human relatedness and meaningful social attachment - Closely connected to this primary impairment is the lack of imitation and associated learning.
- (2) Impairment in competence motivation - This includes the failure of motivation for exploration of objects, and the lack of pleasure in achieving mastery over small environmental segments.
- (3) Disturbances of perceptual integration - This involves both high and low thresholds against incoming sensory information. There is considerable variation in the unusual sensitivities and perceptual distortions shown by the children in specific receptor modalities. However, a most frequent pattern seems to involve high threshold or avoidance of auditory and visual stimuli, and a persistent preference for tactile, kinesthetic, proprioceptive and vestibular stimuli.
- (4) Impairment in the development of cognitive functions - On the receptive side basic discriminations such as the distinction between internal and external stimuli are not readily made. Object constancy does not appear age appropriately, and concepts of space, time, and causality are distorted. On the expressive side language does not develop appropriately, speech may be peculiar and echolalic.

These subclusters, and especially the paramount feature of autism - the lack of human relatedness - have often been considered to be based on emotional dysfunction. Rimland (1964), however, has explained autistic symptoms as an impairment in cognitive

functioning. The subjective emotional experiences of autistic children are difficult to know, but it is even more difficult to participate in the socialization of such children without working assumptions about their emotional states. There has been a growing acceptance of cortical involvement in human emotions. This trend can be traced through research in both physiology and the effects of early experience.

Early theories of emotion formulated by James (1890) and Lange (1885) proposed a peripheral theory of emotions. It was not a state of mind that gave rise to emotions like grief, fear, love, and rage. Instead they believed that bodily changes which followed the perception of the exciting factors were themselves the resulting emotion. A case reported by Dana (1921) illustrates clinical evidence which introduced the role of the cortex in experiencing emotion. A woman fell from a horse and broke her neck. She suffered complete quadriplegia with loss of cutaneous and deep sensations from the neck down. She continued to report normal emotions of grief, joy, displeasure, and affection. No overt changes in personality were detectable as might have been expected from such severe limitation of emotional experience. Such data pointed to higher central nervous system involvement which could not be excluded if the complexities of emotional behavior were to be understood physiologically. Studies began to appear involving areas of the cerebrum that had well-defined anatomical connections with subcortical regulatory mechanisms (Papez, 1937). Although subsequent studies have raised more questions about specific structural functions than have been answered, the involvement of the cortex and limbic system with the experience of emotion is now firmly established in human physiology.

A similar trend on the relationship between cognitive and emotional development can be found in the child development literature. Studies of institutionalized children have supported the conclusion that children whose basic physical needs are met, but who suffer the emotional trauma of maternal deprivation, will show

deleterious and sometimes irreversible effects on their subsequent development. In his review of developmental research, Casler (1961) showed that the effects of maternal deprivation on child development had been misunderstood. Maternal deprivation had been identified as the main cause of the institutionalized child's developmental impairment because insufficient attention was given to the infant's limitations in organizing sensory information at different stages of development. During the first 6 months of life, the infant does not show any differentiated reaction to strangers. Casler argued that the young infant can not react to separation from a specific mother before he is able to differentiate her from strangers. Prior to that time he reacts to deprivation of tactile and other forms of perceptual stimulation. Schaffer's (1959) study of infants hospitalized during the first year of life supports this contention. Infants under 6 months of age responded to the separation by diffusely looking about, while those over 6 months expressed excessive crying and dependency. For these dependency emotions to be expressed during the second half of the first year, the infant needed the capacity to organize his sensory input sufficiently to recognize changes in his surroundings and in caretakers when he was moved from home to the hospital, and to relate these changes to internal states. Lacking this degree of capacity to organize sensory information during the first 6 months, the infants hospitalized during this age period did not express the same emotion as the older infants.

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This is probably not a critical period in the precise sense that has been established for animals. However, it is one sample of the interaction between emotion and perception which continues to articulate with increasing development through childhood. As cognitive operations mature and become more autonomous the child develops an increasing capacity to experience organized cortical activity separately from subjective feeling states, and to coordinate these two systems. In the normal

infant and in the preschool autistic child, however, the capacity to organize internal and external stimuli is virtually undeveloped. At this level, there does not seem to be a meaningful basis for separating impaired emotional attachment from impairment in organizing and coordinating sensory information under cortical control.

Structures of underlying impairment

To explain the autistic child's cardinal developmental failures during the first years of life Ornitz and Ritvo (1968) proposed an inability to maintain constancy of perception. Identical percepts from the environment are not experienced the same each time. This failure to maintain perceptual constancy results in random underloading or overloading of the central nervous system. The resulting physiological states may be characterized by degrees of excitation, facilitation and inhibition of information. These states interact with both hyper and hypo sensitivity, which may occur within the same child and within any receptor systems. According to the Ornitz - Ritvo formulation this results in random perceptual confusion.

The development and maintenance of perceptual integration is also dependent on the stability of the affective system. Affect or emotion appears to involve certain brain structures. Behaviorally these emotional contributions are subsumed under motivation, arousal, and drive levels. There are clear, mutually dependent, interactions between affect and perceptions. According to the animal work of Young (1964), this interaction has a differential effect depending on the receptor systems involved. The inability to maintain a constant affective state over time will impair those perceptions which take place at a distance and require a time lag between perception and consequent behavior. This impairment is greater for perceptual structures involving distant events than for those proximal to the organism in which perception and reaction are immediate.

It would appear that the perceptual inconstancy present in autistic children does not follow the random confusion suggested by the Ornitz - Ritvo report. On the basis of previous studies, Goldfarb (1961), Schopler (1965, 1966), and from following a number of children closely in our treatment program, we have noted that in spite of behavior suggesting irregularities in the processing of sensory data in various receptor modalities, autistic children showed a relatively greater preference for exploration in near receptor modalities such as touch, than they did in distance receptor modalities such as vision and audition. A similar tendency was demonstrated when normal 5 year old children were compared with children 7 to 9 years of age. Without making a general equation between autistic and younger normal children, there appears to be a similarity in their modes of processing sensory data. The younger normal child whose cognitive and language operations are not yet established and developed, relies relatively more on near receptor activity while exploring and learning about his environment. The older child, who is less in need of motor activity and contact, who sits in school, listens and reads, has supplanted some near receptor operations with the distance receptor usage, more closely linked with the higher mental functions. The normal perceptual myopia of the early years is associated with relatively greater use of the near receptor systems including the tactile, kinesthetic, and proprioceptive senses. White (1965) has formulated a hierarchy of learning functions closely related to these shifts in receptor usage. It is not surprising that autistic children with impairments involving the higher cortical organization would also tend to show a preference for near receptor usage. Clinical evidence indicates that autistic children without physical anomalies develop motor functions such as walking, and maintaining balance relatively more normally than they develop higher functions associated with communication. Although there are exceptions, autistic children suffer relatively

less impairment via their near receptor systems than they do auditorily and visually. Without dismissing problems of homeostatic regulation throughout the central nervous system, the most important impairment in autism would seem to be the deficiency in perceptual constancy involving cortical control. As this impairment is reduced, the child's human relatedness also tends to improve.

The unusual receptor preferences of autistic children are consistent with Rimland's theory that the central mechanism in autism involves an impairment in the integration between sensory information and memory. The reticular activating system has been suggested as the specific site of the lesion. Although many functions of the reticular system are still not definitely understood, it now appears almost certain that the reticular formation is involved with monitoring and controlling the input of various sensory modalities; input which is involved with excitation and inhibition of grossly defined events such as receptor sensitivity and cortical activity. Whether or not the reticular system as the locus of the lesion impairing the formation and retrieval of perceptual patterns will be supported by subsequent research is not basic to the proposal that functionally autism is involved with deprivation of organized sensory input to the cortex and association areas. According to Hebb (1958) the repetition of particular sensory events will develop a loop in the cortex with subcortical circuits. These cell assemblies are basic to memory and may be modified by subsequent experience. Development of cell assemblies is based on an assumption in the physiology of learning. Whenever an impulse crosses a synapse it becomes easier for later impulses to do so, possibly because of a chemical change or an enlargement of the synaptic knob. Specific physiological changes caused by environmental changes have been demonstrated experimentally. Rosenzweig, et. al. (1962) showed that an enriched environment for rats produced an increase in the weight of the brain and a greater availability of acetylcholine. Riesen (1960) reported that disuse of

the visual system in baby monkeys produced blindness. Continuous deprivation of cortical organization in the autistic child could eventually lead to disuse of cortical involvement. The likelihood of physiological and biochemical changes under autistic conditions of sensory deprivation introduces an urgency to promote perceptual patterns and responses in the child as early as possible. The child's plight is compounded because the lack of patterned input to the cortex sets off a vicious cycle of disorganized unpleasant cortical feedback which supports the characteristic avoidance patterns. These in turn set off disaffection and confusion in parents and other adults, who diminish in their desire to provide conditions which will help the child. In order to arrest the autistic disorder and to maximize the child's development, a working understanding of the individual child is needed, especially for the concerned parents.

Parents of autistic children

Kanner's original description of autistic children, characterized their parents as obsessive, intellectual people who were emotionally cold. This fit the emphasis many workers placed on the parents as the leading causal agents in their child's autism (Rank, 1950; Szurek, 1956; Mahler, 1952). Bettelheim was an especially strong proponent of this position. In analysing reports of feral children Bettelheim (1959) proposed that these children were not raised by wolves, but instead were autistic children, similar to those at his school, who had been abandoned by their parents. He concluded that the evidence did not support belief in feral children, raised by wolves, but was consistent with the notion that they came from "feral mothers." Ferster (1961) also explained autism as a function of faulty reinforcement by the child's parents. Recently some of the etiological assumptions of parental pathology have been reexamined and challenged (Rimland, 1964; Frank, 1965).

Kanner (1954) reported that only an insignificant number of the blood relatives

of his group of 100 autistic children suffered from psychosis. Similar findings were reported by Stroh (1962), Lotter (1967) and Rutter (1965). Creak (1960) did not think that the personality or attitudes of the parents in her group of children were particularly abnormal, while Goldfarb described parental pathology, especially in his non-organic group. In the Pitfield and Oppenheim (1964) study of childrearing attitudes, the mothers of psychotic children loved their children no less than mothers of normal children, but they tended to be more indulgent and uncertain. The parents in our group do not show any consistent pathology. They tend to be middle class, with average social stability, including adequate job performance, and social relations. They tend to have other children who are not autistic. The parents in our group show perplexity, confusion about child rearing, and a tendency to vacillate between indulgence and rigidity with the child. However, these are inadequacies in appropriate management that can be explained as their reactions to a difficult and unresponsive child.

Although we have not yet completed a formal study, it appears that with preschool autistic children, traits generally associated with schizophasogenic mothering such as emotional detachment, perplexity, and symbiotic dependency, are not predictive of poor prognosis. On the contrary, if there is a predictive indication in parental attitudes, it is their motivation and investment in wanting to raise their child. This kind of investment is often accompanied by anxiety, guilt, demandingness, and other maladaptive child rearing attitudes. These are a handicap to effective child rearing, but are usually only secondary to the overall investment in the child. A similar observation had already been made by Kanner and Eisenberg (1955) when they reported a follow up study on their autistic group. Maximum improvement in their autistic children was primarily

associated with their parents' motivation and effort in behalf of their child. In our experience some of the oft repeated pathogenic characteristics such as high intelligence and emotional control, are often an asset for the parents in working more effectively with their autistic child. High intelligence helps their understanding and acceptance of the child's impairment. Emotional control seems to allow more spontaneity with the necessary special techniques.

Treatment program

In describing our out-patient treatment program, there are three major areas requiring special attention and management with the autistic child.

(1) To obtain a generally receptive and pleasant atmosphere in the relationship between child and parents. (2) To identify receptor systems and stimulus patterns which the child can receive and express in an organized response. (3) To provide conditions under which the child can practice and express whatever organization he has obtained.

The home environment is usually in a high state of tension and confusion when the diagnosis of autism is first made. Parents are filled with fears about the child's prognosis, guilt over their own part in creating the problem, and blame for each other's faults and shortcomings. Their own characteristic style of handling life problems becomes exaggerated, and they look pathologically over protective, indifferent, angry and confused. Their initial suspicion of a specific problem like deafness has not been upheld and broader areas of developmental failure have been confirmed. The mother's concern with her child is taken over by concern with her assaulted self esteem. However the parental reaction is expressed, it results in a decrease of their usual level of spontaneity and appropriate concern, a

level they usually maintain with their other normal children.

Our program is structured to reduce the exaggerated distortions in the parent child bond. Parents work as co-therapists. They observe a therapist or teacher working with their child through a one-way screen. Another staff member observes with the parents and discusses questions and significant aspects of the interaction. Parents take turns in working with their child while they are observed. Out of these observations a home program is developed which the parents carry out daily at home, recording each session on a daily log. This conjoint approach reduces the barrier between parental and professional ideas and responses. The child is not burdened with having to adjust to two unrelated environments when he can still scarcely make sense of any one. Parents tend to become more natural and spontaneous. They learn a new basis for getting fun and pleasure with their relatively unresponsive child. In turn they become more realistic in their awareness of the child and his problem, while at the same time learning special ways of reaching and socializing their child.

The interaction demonstrated to the parents is based on the assumption that each child has a discernable hierarchy of responsiveness, ie., that there is relatively less distortion for him in one receptor system than in another. Although the child may have many problems, our main concern is with his establishing perceptual organization or cortical control over his sensory experience. There is considerable variation in the individual child's use and distortions of particular receptor systems. However, it has been a helpful generalization that primitive perceptual organization is more readily accomplished through the use of near receptors, tactually, kinesthetically and proprioceptively than through visual and auditory distance receptors. In spite of variations among individual autistic children, the near

receptor systems seem to offer a better starting point for establishing dependable perceptual patterns for the child than does the engagement with his auditory and visual systems. The emphasis on certain receptor systems can best be illustrated in the context of four major treatment goals of our program. These include the child's lack of human relatedness, his perceptual motor disturbances, his impaired cognitive development, and his inability to achieve competence motivation and self initiated exploratory play.

Human relatedness

The child's lack of relatedness is usually striking during the very first session. He pays no attention to verbal communication or directions and avoids looking at the person who is with him. Rather than attempting to shape a response to a particular verbal command, we generally use physical contact, cuddling, mild roughhousing and swinging games. This approach can often develop attachment rapidly within an atmosphere of fun and pleasure, which is usually absent for these children. However, the child's experience of pleasure is not an end in itself. Any form of cuddling or physical contact is made into a game when possible, a simple rhythmic repetition that the child can anticipate and try to repeat. For example, the child may be lifted or bounced up and down in a rhythmic pattern. When the play is stopped and the child has enjoyed it, he tries to effect a repetition of this game. The child's effort for repetition involves both social attachment and some awareness about the nature of pleasurable experience. The child may still be oblivious to verbal and visual communication, but he does not avoid the near receptor experience. As the child responds favorably to this kind of physical interaction, he does not seem flooded by perceptual confusion. There are some autistic children

who do not respond favorably to physical contact. They may be extremely irritable, prone to temper tantrums or self destructive behavior. When a child is in this phase, physical contact becomes an added irritant and produces more disorganization. When the child is expressing active, global negativism which prevents any differentiated response, we found it most helpful to use some of the conditioning procedures demonstrated by Lovaas (1965). We have used aversive conditioning such as placing a child in a corner by himself, until the tantrums cease, at the same time offering the alternative of positive reinforcers such as toys or candy. After the pervasive negativism is controlled, our efforts to develop spontaneous response patterns are resumed.

The children's lack of imitation is closely associated with lack of relatedness. With our preschool autistic children speech development is seriously delayed. Although individual words or sounds can be conditioned, we have found that preverbal learning can be promoted more rapidly and with more meaning to the child. Patterned responses involving the near receptor systems are often more rapidly attained and repeated by the child than response patterns to visual or auditory stimuli. Many children can imitate clapping, tapping, jumping, stamping, more easily than they can verbal sounds. Moreover, this type of imitative control seems to facilitate vocal control. Some children engage in reflexive head nodding or headshaking. As this appears in the appropriate context it can be developed into a meaningful "yes" or "no" signal before the words for "yes" and "no" are used by the child. The autistic child's direct bodily experiences seem to provide more reliable perceptual patterns which can lead to communication signals.

Perceptual motor disturbance

Problems to be worked on in the perceptual motor area are not separate from other symptom subclusters, such as lack of relatedness. However, the content of the teaching interaction is different. When focusing on the relationship impairment, the task definition or game played is secondary and can be changed to develop a balanced interaction between child and adult. When the focus is on the perceptual motor area, continuous exercise of the perceptual motor task has priority over the balanced relationship. This may be the basic task of helping the child to use both hands as in clapping, block building or manipulatory play with objects. For example, in developing hand-eye coordination, jig saw puzzles are a useful tool. For autistic children the shape of the puzzle tends to be the primary cue for putting it together correctly, while the color and design of the puzzle picture is ignored. Although the child is also looking at the shape, he is generally guiding his movements by contact with the contours only. In order to exercise the use of visual cues over the tactile ones we have developed a puzzle sequence in which first the form of the puzzle pieces determines correct fit. Then by gradual steps these form cues are faded out and only visual, pictorial cues determine correct completion. Birch (1963), Blank and Bridger (1964) have found types of cross-modal transfer which are language dependent, while others are not. Some case observations suggest that the transfer from tactile to visual puzzle solving represents a preverbal function, necessary for later language acquisition.

The selective involvement of the child's receptor systems was illustrated by the puzzle sequence. There is also a wide range of sensitivity and distortion each child may show in response to any stimulus class. In the auditory sense,

louder than normal directions often obtain a more definite response, as do pictures in vivid, primary colors. Magnification of tactal contact often produces a more integrated response. In spite of the great variations in sensitivity, it seems that autistic children often respond more appropriately when organized stimulus patterns are magnified (Metz 1968). The opposite direction has also occurred. Some children become panic stricken and anxious over loud sounds. They cover their ears, turn away and become visibly frightened. This hypersensitivity can be reduced by training. For example, in our clinic observation room the intercom occasionally emits a spontaneous loud tone. One of our children reacted with a paralysing panic each time he heard this sound. He was permitted to play with volume control, adjusting the sound level himself. He soon manipulated the volume knob over a wide range. With this degree of control and understanding of the sound his panic reaction disappeared. He also reacted with panic to the sound of an electric drill and construction noises. His hypersensitivity to auditory stimuli diminished as he developed better understanding of and capacity to integrate a new frightening sound. The capacity to exercise cortical control and integration led to mastery over his panic reaction to certain auditory stimuli. Our emphasis is on helping the child develop perceptual constancy and awareness on whatever level possible. Autistic children suffer many conceptual impairments which are closely interwoven with language development.

Cognitive impairments

As the normal child develops a sense of constancy in perceptual experiences, environmental representations are clarified and stabilized. New details are recognized as belonging with certain stimulus patterns. The use of verbal labels greatly facilitates the capacity to organize perceptual experience.

Likewise the capacity to recognize and respond to increasingly complex perceptual patterns facilitates verbal development.

When the child's capacity to organize and respond to perceptual patterns is impaired, his development of concepts involving time, space and causality cannot proceed at a normal rate. In our program teaching of words and concepts is closely linked. The child's readiness to recognize specific objects by name, seems to develop ahead of expressive vocabulary. Concepts of space, such as "where," are linked in our program with prepositions such as "inside," "outside," "over," "under," "in front," "behind." Parents involve the child in placing familiar articles in the appropriate place at home. He learns verbal concepts more rapidly as he is involved in near receptor operations of appropriate placing. Using a form of hide and seek game, good motivation and success in learning spatial discriminations can be attained.

Pronoun reversal and the autistic child's failure to learn pronouns have been reported by many observers. In his latest book, Bettelheim (1967) associated the pronoun problem with the autistic child's failure to develop his identity. The concept of identity is a complex one and difficult to translate into a clear teaching program. Teaching a child pronouns correctly is also difficult. If he has a piece of candy you can say, "It's yours," but to him "it's mine." It is precisely the reversibility required for learning pronouns that is so difficult for these children. We have used a play situation in which correct pronouns can be practiced accurately with the child. The parent or teacher sits on the floor with him, surrounded by dolls of a doctor, a nurse, a boy, and a girl. The teacher shows the child a piece of candy and places it in front of the nurse doll, saying "I'm giving this piece to the nurse. Whose is it?"

"I'm giving this piece of candy to you. Whose is it?" In this way the child can learn the correct pronouns. The success of this procedure is not claimed as a lesson in identity. It is, however, an illustration of the special structuring required to help autistic children achieve a degree of flexibility in their mental operations. While emphasis must initially be placed on the development of basic functions in each of the four areas discussed, we have found that continued development of these functions occurs only when integration between them is also acquired. Thus, as the child learns basic affective patterns, perceptual and cognitive skills, these new abilities are integrated in his behavior by structured interactions and tasks. Expressive, as well as receptive abilities are also taught and integrated so that the child may not only respond to events, but more important he monitors his own behavior as well.

So far our treatment program has been described for the special structuring of stimuli used by parents or therapists for evoking perceptual and cognitive response patterns in the child. The structuring of stimulus patterns is necessary for transforming some of the child's basic confusion. But these internalized patterns must also become available to the child for selection and modification in new situations. In order to stimulate the child's own practice and recall of newly acquired organization, a certain amount of time is planned without special structures. The child is free to initiate his own activity. The greater the child's disorganization, the smaller the proportion of self initiated activity which is planned. However, a sounding of self initiated activity is made regularly. When left to their own initiative the children sometimes look more regressed. Peculiar movements and handshaking reappear. The child may return to preoccupation with a single toy or object. These autistic responses,

however, often appear in altered form. The child may now sit still longer and accept variations in his stereotyped play. For example, with one child we had been trying to establish response inhibition so that rhythmic tapping could be imitated. This youngster could imitate clapping or tapping, but would not imitate two taps or three taps. After several sessions he imitated a double tap several times, and attended to three and four taps without actually imitating them. The next time during his free period, he spontaneously tapped three and four times. Practice with delayed imitation brought on more rhythmic patterns than did the direct tapping exercise.

In this unstructured situation the child may return to picking up an object with which he has long been preoccupied, such as a toy train or a piece of string. In some treatment programs these autistic fetishes are considered as undesirable symptoms to be discouraged. However, we have found that the child's narrow and intensive interest is not only a sign of autism, but also the means by which he is able to register a narrow band of perceptual constancy. When the child is permitted to return to a fetish object after he has learned some patterned responses, some improvement in interaction is often seen. For example, one child had been holding on to a piece of string, tapping at it occasionally, and taking it wherever he went. When any adult approached him the child became irritable or abandoned the string. After he had acquired a few motoric imitations, he was able to engage in a back and forth pulling game with the string. He enjoyed it and elaborated on his previously simple string tapping. The development of more elaborations on specific fetishes occurs quite often. To engage in predictable back and forth pulling may seem like a very small achievement. However, small units of patterned perception and responses come together bit

by bit, and increase the autistic child's adaptive interactions by small increments.

Summary

The central impairment in the pre-school autistic child was formulated as a lack of cortical control and integration of perceptual information, resulting in both emotional and cognitive impairment. Relative hierarchies of disturbed functioning were identified within the child's receptor systems. Usually there was relatively less distortion within the child's near receptor systems of touch, kinesthesia, and proprioception, than within the distance receptor systems of audition and vision. Rather than being a primary cause of the autistic condition, maladaptive parental attitudes and management are reactive to the child's impairment. Further research will be needed to determine how far this formulation can be generalized to autistic children with varying symptom combinations. The implications of this framework were discussed in our pre-school training program, implemented by parents and teachers. Based on the child's availability via his various receptor systems, special approaches were developed for parents to use at home. Initial results in our program have been encouraging. Children who would have been institutionalized were able to stay at home and evolved a more natural relationship with their parents. They have been able to make a developmental progress under their parents' direction. Not long ago many clinicians felt that when the basis for psychological disorder was psychogenic, the prognosis for treatment was good, while if the basis of the disorder was primarily organic, the prospects for a positive therapeutic outcome were dim. From our experience, the opposite direction is suggested. If the treatment is based on a clear consideration of biological structures, the limitations of maturation and of the child's specific impairments, then the realization of the child's maximum development is greatly

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enhanced, and may be most effectively developed in his home environment.

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